Data sheet

# PRF13-E1AM1020

## HighLine

**WIRE DRAW ENCODERS**

SICK
Sensor Intelligence.

## Ordering information

| Type | part no. |
|---|---|
| PRF13-E1AM1020 | 1034337 |

**Included in delivery:** DFS60B-S1MA10000 (1), MRA-F130-110D2 (1)

Other models and accessories ➜ www.sick.com/HighLine

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **$MTTF_D$ (mean time to dangerous failure)** | 300 years (EN ISO 13849-1) [1] |

[1] This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

### Performance

| | |
|---|---|
| **Measurement range** | 0 m ... 10 m |
| **Encoder** | Incremental encoders |
| **Resolution (wire draw + encoder)** | 0.03 mm [1] [2] |
| **Repeatability** | ≤ 1.5 mm [3] |
| **Linearity** | ≤ ± 2 mm [3] |
| **Hysteresis** | ≤ 3 mm [3] |

[1] The values shown have been rounded.
[2] Example calculation based on the PRF08 with HTL Push Pull: 200 mm (wire draw length per revolution - see Mechanical data): 2,000 (pulses per revolution) = 0.1 mm (resolution of wire draw + encoder combination).
[3] Value applies to wire draw mechanism.

### Interfaces

| | |
|---|---|
| **Communication interface** | Incremental / HTL / Push pull |
| **Programmable/configurable** | ✓ |
| **Factory setting** | The built-on DFS60 encoders are programmed to the specified number of lines and interface prior to delivery. The electrical interface (TTL/HTL) and the number of lines (up to max. 10,000 lines) can be set in accordance with customer requirements with our programming devices for DFS60 encoders, which are available separately. |

### Electronics

| | |
|---|---|
| **Connection type** | Male connector, M23, 12-pin, radial |
| **Supply voltage** | 10 V ... 32 V |
| **Power consumption** | ≤ 0.7 W (without load) |

## Mechanics

| | |
|---|---|
| **Weight** | 3.8 kg |
| **Measuring wire material** | Highly flexible stranded steel 1,4401 stainless steel V4A |
| **Measuring wire diameter** | 1.35 mm |
| **Weight (measuring wire)** | 7.1 g/m |
| **Housing material, wire draw mechanism** | Aluminum (anodised), plastic |
| **Spring return force** | 10 N ... 20 N [1] |
| **Length of wire pulled out per revolution** | 332.4 mm |
| **Life of wire draw mechanism** | Typ. 1,000,000 cycles [2] [3] |
| **Actual wire draw length** | 10.2 m |
| **Wire acceleration** | 40 m/s² |
| **Operating speed** | 8 m/s |
| **Mounted encoder** | DFS60, DFS60B-S1MA10000, 1056866 |
| **Mounted mechanic** | MRA-F130-110D2, 6028627 |

[1] These values were measred at an ambient temperature of 25 °C. There may be variations at other temperatures.
[2] Average values, which depend on the application.
[3] The service life depends on the type of load. This is influenced by environmental conditions, the installation location, the measuring range in use, the traversing speed, and acceleration.

## Ambient data

| | |
|---|---|
| **EMC** | According to EN 61000-6-2 and EN 61000-6-3 |
| **Enclosure rating** | IP64, mounted mechanic<br>IP67, Encoder (IEC 60529) [1] |
| **Operating temperature range** | –30 °C ... +70 °C |

[1] With mating connector fitted.

## Certificates

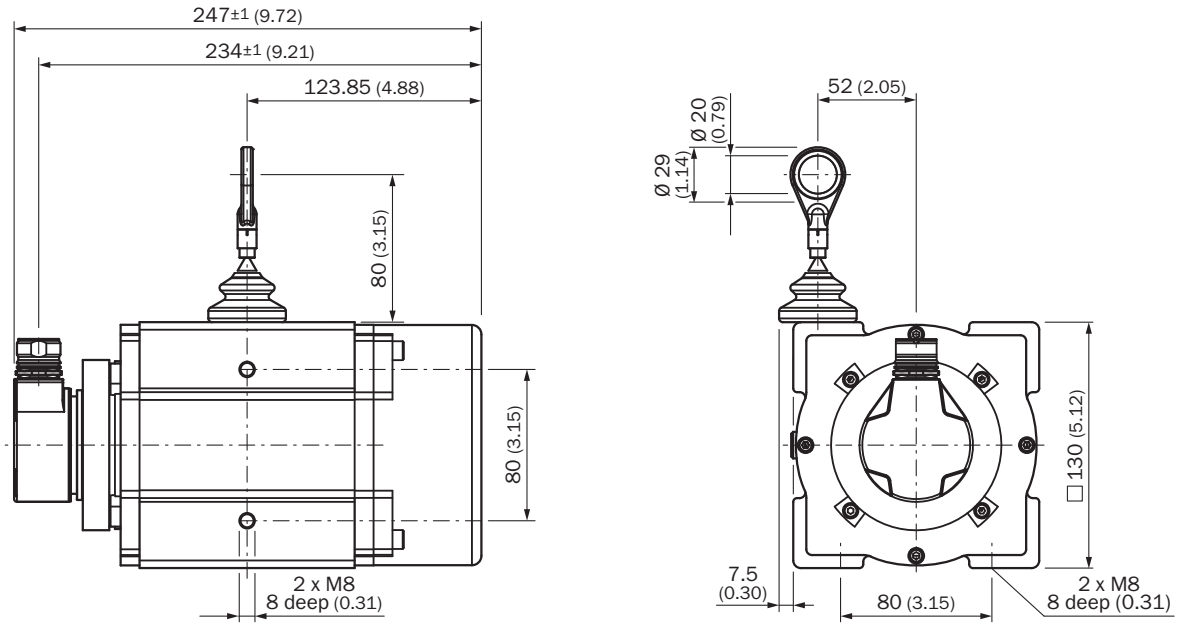
| | |
|---|---|
| **EU declaration of conformity** | ✓ |
| **UK declaration of conformity** | ✓ |
| **ACMA declaration of conformity** | ✓ |
| **Moroccan declaration of conformity** | ✓ |
| **China RoHS** | ✓ |

## Classifications

| | |
|---|---|
| **ECLASS 5.0** | 27270590 |
| **ECLASS 5.1.4** | 27270590 |
| **ECLASS 6.0** | 27270590 |
| **ECLASS 6.2** | 27270590 |
| **ECLASS 7.0** | 27270590 |
| **ECLASS 8.0** | 27270590 |
| **ECLASS 8.1** | 27270590 |
| **ECLASS 9.0** | 27270590 |
| **ECLASS 10.0** | 27270613 |
| **ECLASS 11.0** | 27270503 |

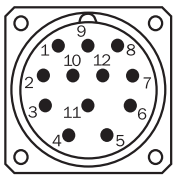
| | |
|---|---|
| **ECLASS 12.0** | 27270503 |
| **ETIM 5.0** | EC001486 |
| **ETIM 6.0** | EC001486 |
| **ETIM 7.0** | EC001486 |
| **ETIM 8.0** | EC001486 |
| **UNSPSC 16.0901** | 41112113 |

## Dimensional drawing




Dimensions in mm (inch)

## Anschlussbelegung




view of M23 male device connector on encoder

| PINMale connector M12, 8-pin | PINMale connector M23, 12-pin | Wire colors (cable connection) | TTL/HTL signal | Sin/Cos 1.0 $V_{PP}$ | Explanation |
|---|---|---|---|---|---|
| 1 | 6 | Brown | $\overline{A}$ | COS- | Signal wire |
| 2 | 5 | White | A | COS+ | Signal wire |
| 3 | 1 | Black | $\overline{B}$ | SIN- | Signal wire |
| 4 | 8 | Pink | B | SIN+ | Signal wire |
| 5 | 4 | Yellow | $\overline{Z}$ | $\overline{Z}$ | Signal wire |
| 6 | 3 | Purple | Z | Z | Signal wire |

| PINMale connector M12, 8-pin | PINMale connector M23, 12-pin | Wire colors (cable connection) | TTL/HTL signal | Sin/Cos 1.0 $V_{PP}$ | Explanation |
|---|---|---|---|---|---|
| 7 | 10 | Blue | GND | GND | Ground connection |
| 8 | 12 | Red | $+U_S$ | $+U_S$ | Supply voltage |
| - | 9 | - | N.c. | N.c. | Not assigned |
| - | 2 | - | N.c. | N.c. | Not assigned |
| - | 11 | - | N.c. | N.c. | Not assigned |
| - | 7 [1)] | Orange | 0-SET [1)] | N.c. | Set zero pulse[1)] |
| Shielding | Shielding | Shielding | Shielding | Shielding | Screen connected to housing on encoder side. Connected to ground on control side. |

[1)] For electrical interfaces only: M, U, V, W with 0-SET function on PIN 7 on M23 plug. The 0-SET input is used to set the zero pulse to the current shaft position. If the 0-SET input is applied to US for longer than 250 ms after it has previously been open or applied to GND for at least 1,000 ms, the current shaft position is assigned zero pulse signal “Z”.

## Recommended accessories

Other models and accessories ➜ www.sick.com/HighLine

| | Brief description | Type | part no. |
|---|---|---|---|
| Mounting systems | | | |
| | • **Description:** Joint ball for later insertion in wire end ring with 20 mm diameter. The use of this joint ball enables movement in multiple levels of freedom. | Joint protection for wire rope BTF/PRF/MRA | 5318683 |
| | • **Description:** Compressed air attachment for MRA-F080... and MRA-F130... HighLine wire draw mechanism | MRA-F-P | 6073769 |
| | • **Description:** Additional brush attachment for wire draw mechanism MRA-F130 (5 m, 10 m, 20 m and 30 m from HighLine series) | MRA-F130-B | 6038562 |
| | • **Description:** Wire draw deflection pulley for wire draw mechanism MRA-F130 (5m, 10m, 20m and 30m from HighLine series) | MRA-F130-R | 6028631 |

| | Brief description | Type | part no. |
|---|---|---|---|
| programming devices | | | |
| | • **Product segment:** Programming devices<br>• **Product family:** PGT-10 Pro<br>• **Description:** Programming unit display for programmable SICK DFS60, DFV60, AFS/AFM60, AHS/AHM36 encoders, and wire draw encoder with DFS60, AFS/AFM60 and AHS/AHM36. Compact dimensions, low weight, and intuitive operation.<br>• **Items supplied:** 1 x PGT-10-Pro stand-alone programming tool,4 x alkaline type batteries, 1.5 V Mignon (AA) | PGT-10-Pro | 1072254 |
| | • **Product segment:** Programming devices<br>• **Product family:** PGT-08-S<br>• **Description:** USB programming unit, for programmable SICK encoders AFS60, AFM60, DFS60, VFS60, DFV60 and wire draw encoders with programmable encoders. Not compatible with the portable SOPAS ET versions. | PGT-08-S | 1036616 |
| Wire draw mechanism | | | |
| | • **Product segment:** Wire draw mechanism<br>• **Product family:** Wire draw mechanism for wire draw encoders<br>• **Description:** HighLine wire draw mechanism for servo flange with 6 mm shaft, measuring range 0 m ... 10 m<br>• **Items supplied:** Without encoder | MRA-F130-110D2 | 6028627 |

| | Brief description | Type | part no. |
|---|---|---|---|
| connectors and cables | | | |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 2 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G02MLA3 | 2030682 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 7 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G07MLA3 | 2030685 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 10 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G10MLA3 | 2030688 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 15 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G15MLA3 | 2030692 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 20 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G20MLA3 | 2030695 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 25 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G25MLA3 | 2030699 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 30 m, 11-wire, PUR<br>• **Description:** Incremental, shielded | DOL-2312-G30MLA3 | 2030702 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 1.5 m, 12-wire, PUR, halogen-free<br>• **Description:** Incremental, shielded | DOL-2312-G1M5MA3 | 2029212 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 3 m, 12-wire, PUR, halogen-free<br>• **Description:** Incremental, shielded | DOL-2312-G03MMA3 | 2029213 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 5 m, 12-wire, PUR, halogen-free<br>• **Description:** Incremental, shielded | DOL-2312-G05MMA3 | 2029214 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 10 m, 12-wire, PUR, halogen-free<br>• **Description:** Incremental, shielded | DOL-2312-G10MMA3 | 2029215 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 20 m, 12-wire, PUR, halogen-free<br>• **Description:** Incremental, shielded | DOL-2312-G20MMA3 | 2029216 |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Incremental<br>• **Cable:** 30 m, 12-wire, PUR, halogen-free | DOL-2312-G30MMA3 | 2029217 |

| | Brief description | Type | part no. |
|---|---|---|---|
| | • **Description:** Incremental, shielded | | |
| | • **Connection type head A:** Female connector, M23, 12-pin, straight, A-coded<br>• **Signal type:** HIPERFACE®, SSI, Incremental<br>• **Description:** HIPERFACE®, shieldedSSIIncremental<br>• **Connection systems:** Solder connection | DOS-2312-G02 | 2077057 |
| | • **Connection type head A:** Female connector, M23, 12-pin, angled, A-coded<br>• **Signal type:** HIPERFACE®, SSI, Incremental<br>• **Description:** HIPERFACE®, shieldedSSIIncremental<br>• **Connection systems:** Solder connection | DOS-2312-W01 | 2072580 |

# SICK AT A GLANCE

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